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REPUBLIC OF CROATIA

Ministry of Environmental Protection and Energy

Annual report for 2018

on the progress made towards achieving the national energy efficiency targets under Article 24(1) in accordance with Part 1 of Annex XIV Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC

Zagreb, March 2020

Contents

Introduction

When it joined the European Union on 1 July 2013, the Republic of Croatia, like all the other Member States, in accordance with Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC, undertook to increase energy efficiency in the EU in order to achieve the objective of saving 20% of the Union's primary energy consumption by 2020, compared to projections (with regard to the business-as-usual or baseline energy consumption scenario).

The Conclusions of the European Council of 17 June 2010 confirmed the energy efficiency target as one of the headline targets of the Union's new strategy for jobs and smart, sustainable and inclusive growth ('Europe 2020 Strategy'). As part of this process and in order to implement the said objective at national level, Member States are required to set national targets in close dialogue with the Commission and to indicate, in their National Reform Programmes, how they intend to achieve them.

To achieve this fundamental objective, each Member State is required to draw up national energy efficiency action plans laying down national energy savings targets in accordance with a set methodology, as well as sector-specific measures and objectives. Each action plan analyses the effects and, where necessary, revises current measures while also setting new sector-specific measures in order to ensure compliance with the targets by 2020.

The significance of energy efficiency in the Republic of Croatia is reflected in the country's laws and strategies. The Energy Act highlights energy efficiency as a matter of national interest and the Energy Efficiency Act (*Narodne novine* (NN; Official Gazette of the Republic of Croatia) Nos 127/14 and 116/18) encourages energy efficiency and the development of an energy services market.

In accordance with European Directive 2006/2/EC on energy end-use efficiency and energy services (the ESD), a National Energy Efficiency Programme for the period 2008-2016 was drafted and adopted. The Government of the Republic of Croatia has also adopted the fourth National Energy Efficiency Action Plan for the period up to the end of 2019; the action plan has been forwarded to the European Commission, which reviews the action plans of all Member States and analyses the achievement of the EU target.

A. Estimate of indicators for the year before last (2017)

I. PRIMARY ENERGY CONSUMPTION

Table 1 gives a breakdown of total energy consumption by form of energy in the period 2012-2017. Figure 1 shows the development of total energy consumption from 1988 to 2017. In 2017, total energy consumption in Croatia was 2% more than in the preceding year. Consumption of coal and coke fell by 32.6%, consumption of hydro power by 18% and consumption of wood and solid biomass by 0.7%. The consumption of all other forms of energy increased, with imported electricity showing the greatest increase of 25.7 %. The consumption of other renewable sources achieved a very high increase of 24.9%, while the consumption of natural gas increased by 14.9%. Consumption of liquid fuels increased by 6.9% and heat produced by heat pumps increased by 1%.

In the period 2012-2017 total energy consumption increased at an average annual rate of 0.8%. In this period, there was a trend of growth in the consumption of other renewables, hydro power, heat produced by heat pumps, liquid fuels and natural gas while other forms of energy saw a downward trend in consumption. Consumption of other renewable energy sources increased by up to 23% with consumption of hydro power growing at an average annual rate of 2.6%. There was a trend of growth in the consumption of heat energy from heat pumps, with an average annual rate of increase of 1.7%. The consumption of liquid fuels and natural gas grew at average annual rates of 0.8% and 0.6% respectively. The consumption of coal and coke decreased at an average annual rate of 5.3%, and the consumption of imported electricity at an average annual rate of 1.3%. The trend of reduced consumption of wood and solid biomass was negligible.

Tablica 1. Ukupna potrošnja energije
Table 1. Total Primary Energy Supply

	2012	***2013***	***2014***	***2015***	***2016***	***2017***		***2017/16***	***2012-17***
	PJ							***%***	
Ugljen i koks *Coal and coke*	28.37	32.18	31.59	29.86	32.14	21.65		-32.6	-5.3
Dno i biomasa *Wood and biomass*	52.10	51.67	46.12	52.69	52.47	52.09		-0.7	-0.003
Tekuća goriva *Liquid Fuels*	134.17	128.37	125.80	130.92	130.78	139.83		6.9	0.8
Prirodni plin *Natural Gas*	101.78	95.54	84.62	87.16	91.08	104.67		14.9	0.6
Vodne snage *Hydro Power*	47.32	84.92	88.99	61.63	65.63	53.81		-18.0	2.6
Električna energija *Electricity*	26.75	13.93	14.23	24.44	19.91	25.03		25.7	-1.3
Toplinska energija *Heat*	0.61	0.63	0.52	0.62	0.66	0.67		1.0	1.7
Obnovljivi izvori *Renewables*	5.72	7.80	10.52	11.36	12.90	16.11		24.9	23.0
UKUPNO ***TOTAL***	**396.83**	**415.04**	**402.40**	**398.68**	**405.56**	**413.86**		**2.0**	**0.8**

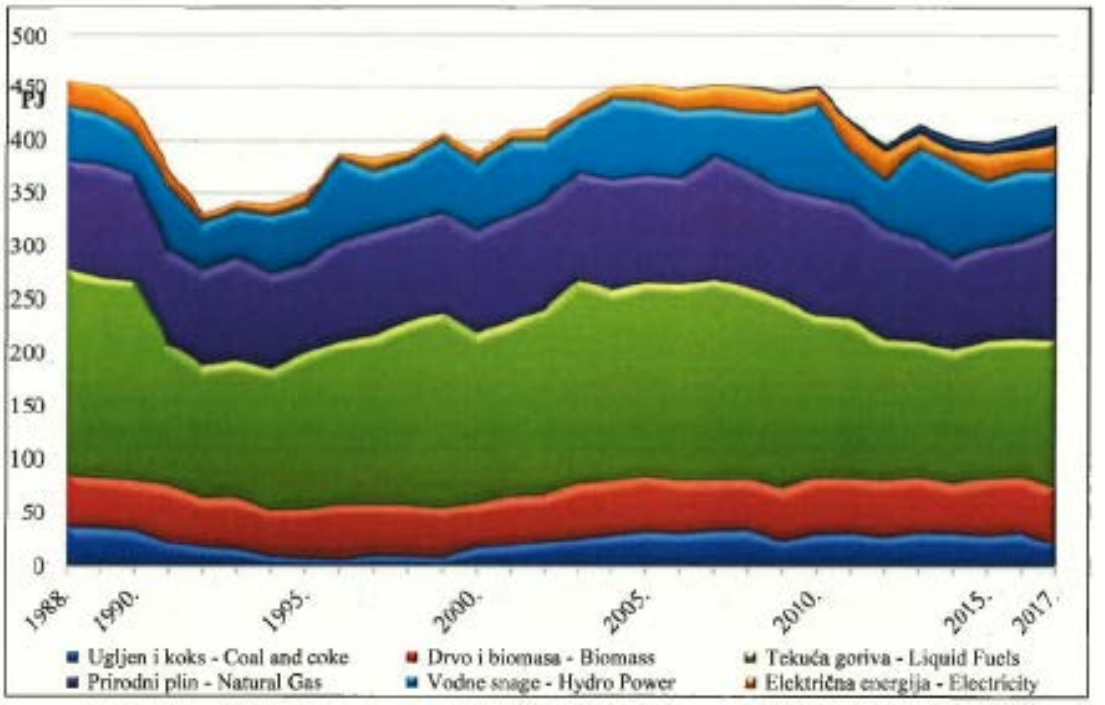


Figure 1. Total energy consumption in Croatia

(Source: Energy in Croatia 2017)

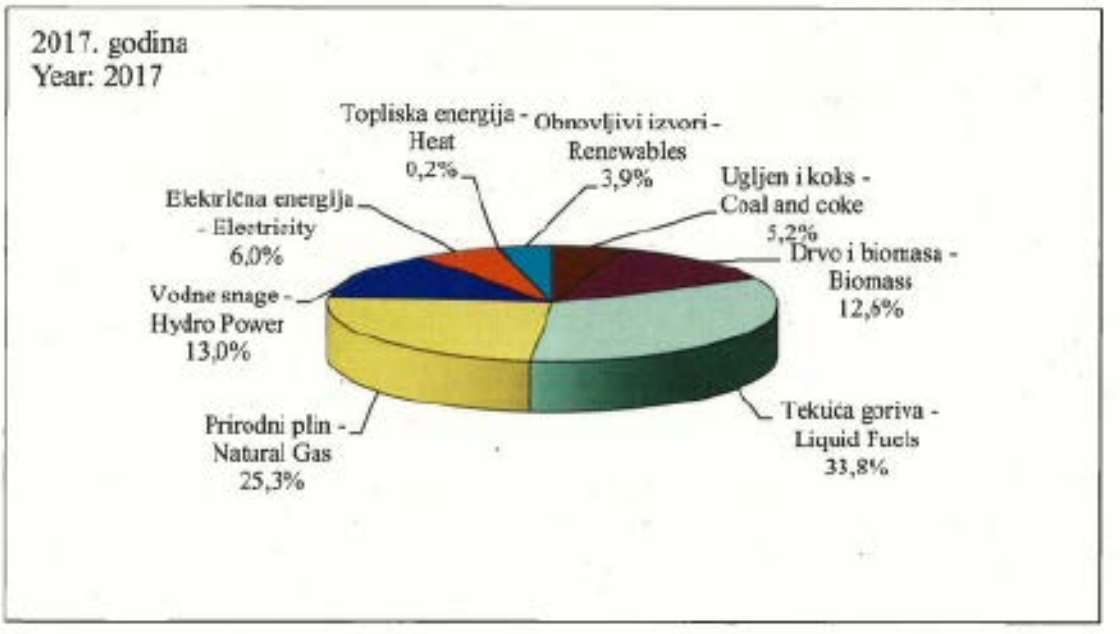


Figure 2. Shares of total energy consumption

(Source: Energy in Croatia 2017)

Figure 2 provides a breakdown of total energy consumption in 2017 by energy source.

Liquid fuels account for the largest share of total energy consumption in Croatia. Their share amounted to 33.8% in 2012 and did not change by 2017. Apart from the share of liquid fuels, the share of heat from heat pumps remained unchanged at only 0.2%. The shares of other renewable sources (wind energy, solar energy, geothermal energy, biodiesel and biogas) and hydro power increased, with the share of other renewables increasing from 1.4% to 3.9% and

that of hydro power from 11.9 to 13%. The share of natural gas fell from 25.6 to 25.3% and that of wood and solid biomass from 13.1% to 12.6%. In addition, the share of coal and coke fell from 7.2 to 5.2% and that of imported electricity from 6.7 to 6%.

II. TOTAL FINAL (END-USE) ENERGY CONSUMPTION

Table 2 gives a breakdown of all energy consumed in Croatia from 2012 to 2017. Figure 3 shows a breakdown of total energy requirements from 1988 to 2017. In 2017, total energy consumption increased by 2%. Conversion losses were reduced by 8.1% and transmission losses by 2.1%. End-use energy consumption increased by 4.4% and non-energy consumption by 3.5%. Energy consumption for energy sector own use increased by 6.7%.

In the period 2012-2017, total energy consumption increased at an average annual rate of 0.8%. Energy transmission losses and energy sector own-use consumption saw a decreasing trend at average annual rates of 2.1% and 1.7% while other needs in the total energy consumption structure produced an upward trend. Conversion losses increased at an average annual rate of 2.6% and end-use energy consumption at an average annual rate of 0.8%. Non-energy energy consumption did not change significantly, achieving a minimal growth rate of only 0.03% per year.

Tablica 2. Struktura ukupno utrošene energije
Table 2. Total Primary Energy Supply by Sectors

	2012	*2013*	*2014*	*2015*	*2016*	*2017*	*2017/16*	*2012-17*
			PJ				*%*	
Ukupna potrošnja energije ***Total Primary Energy Supply***	**396.83**	**415.04**	**402.40**	**398.68**	**405.56**	**413.86**	**2.0**	**0.8**
Gubici transformacija *Conversion Losses*	60.30	84.07	83.49	67.23	74.56	68.55	-8.1	2.6
Pogonska potrošnja *Energy Sector Own Use*	26.57	24.33	26.72	24.99	22.88	24.41	6.7	-1.7
Gubici transporta i distribucije *Transmission Losses*	10.00	9.76	8.87	9.21	9.20	9.01	-2.1	-2.1
Neenergetska potrošnja *Non Energy Use*	22.31	22.52	22.60	22.17	21.58	22.34	3.5	0.03
Neposredna potrošnja energije ***Final Energy Consumption***	**277.65**	**274.37**	**260.72**	**275.07**	**277.34**	**289.55**	**4.4**	**0.8**
- Industrija - *Industry*	41.56	40.91	40.63	40.42	40.30	44.48	10.4	1.4
- Promet - *Transport*	84.02	85.51	84.53	88.37	90.71	98.04	8.1	3.1
- Opća potrošnja - *Other Sectors*	152.07	147.95	135.56	146.29	146.33	147.02	0.5	-0.7

Source: Energy in Croatia 2017.

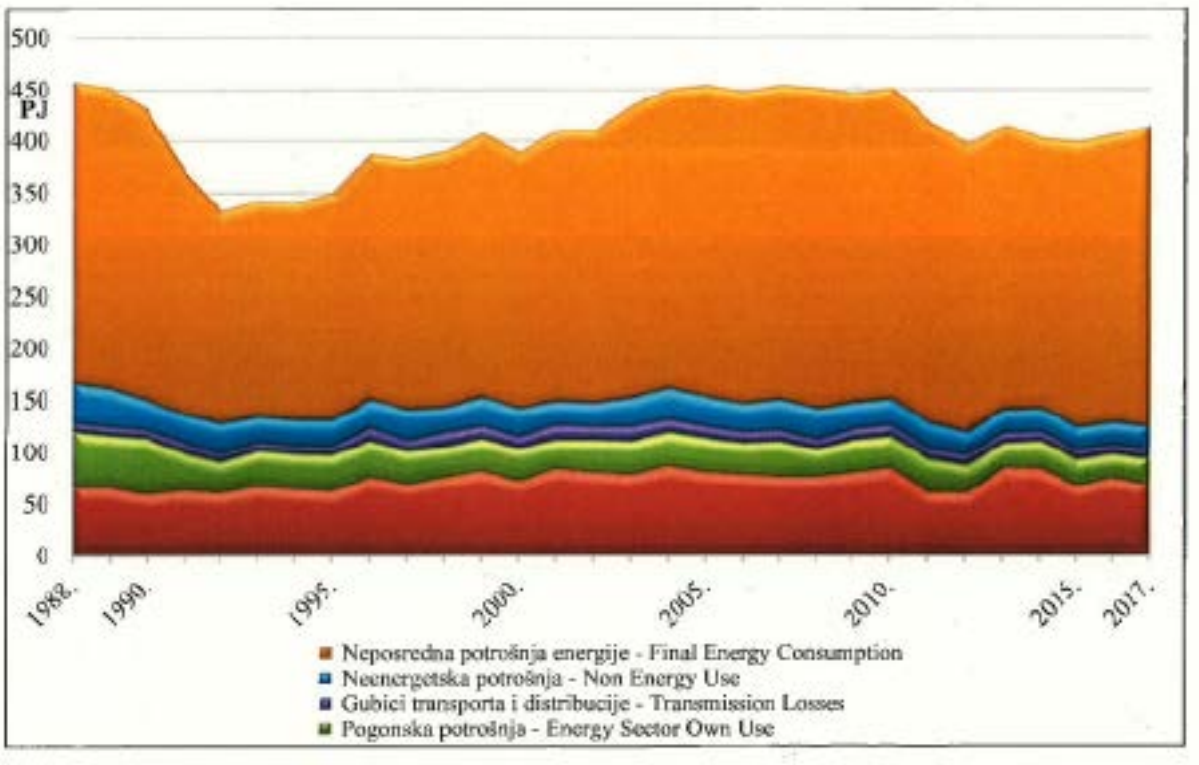


Figure 3. Breakdown of total energy consumption

(Source: Energy in Croatia 2017)

End-use energy consumption accounted for the largest share of the total energy consumption, with an unchanged 70% share in the period under consideration.

In the period 2012-2017, conversion losses increased by 1.4% to 16.6% in 2017. The shares of other sectors within total energy consumption decreased. The share of own-use energy consumption decreased from 6.7% to 5.9% and the share of non-energy consumption from 5.6% to 5.4%. The share of transmission losses fell by 0.3% to 2.2% in 2017.

III. END-USE ENERGY CONSUMPTION BY SECTOR: INDUSTRY, TRANSPORT AND GENERAL CONSUMPTION (HOUSEHOLDS, SERVICES, AGRICULTURE AND CONSTRUCTION)

Table 2 provides a breakdown of energy consumption by three characteristic end-use sectors: industry, transport and general consumption. Figure 4 shows the development of energy consumption in the three sectors since 1988. The general consumption sector comprises household, service, agriculture and construction sectors. Energy consumption in industry increased by 10.4% in 2017 compared to 2016. Consumption increased by 0.5% in the general consumption sector and by 8.1% in the transport sector. The period 2012-2017 saw a trend of increasing energy consumption in industry at an average annual rate of 1.4%. The transport sector saw energy consumption rise at an average rate of 3.1% per year, while the general consumption sector recorded an average decrease of 0.7% per year.

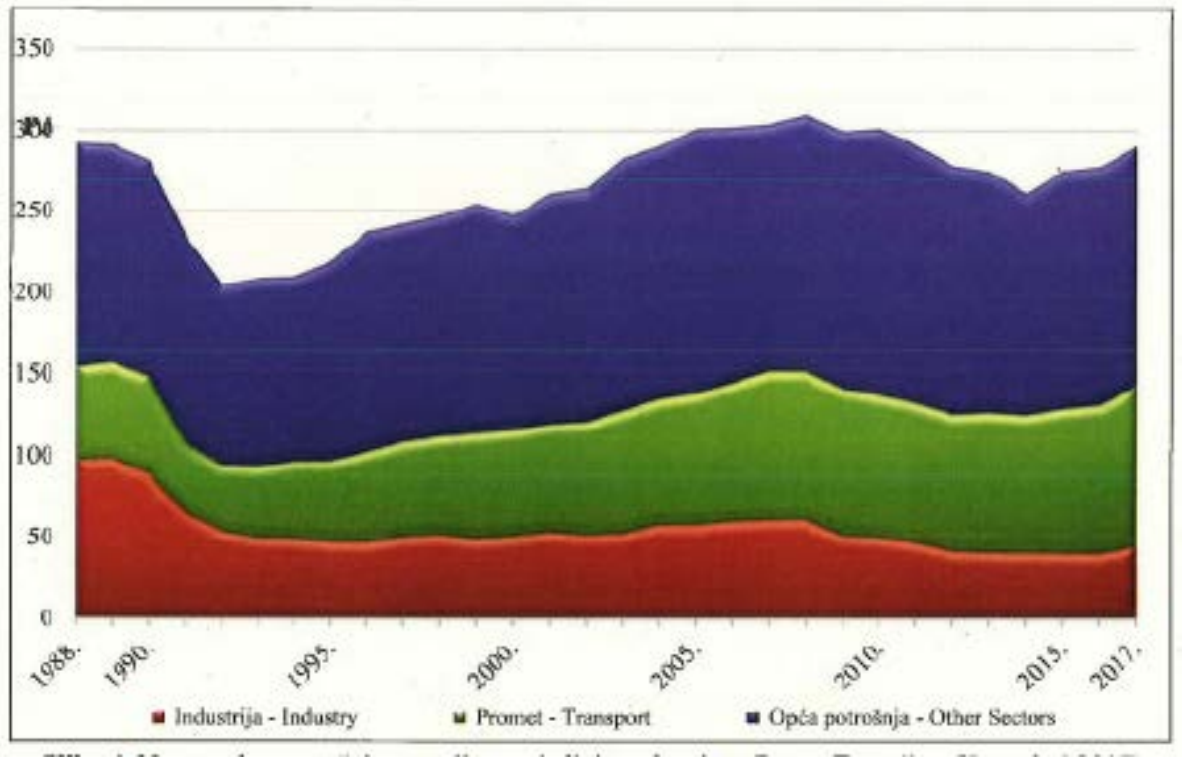


Figure 4. End-use energy consumption in individual sectors

(Source: Energy in Croatia 2017)

Figure 5 shows the shares of individual end-use energy sectors in 2017. The share of general consumption fell from 54.8% to 50.8%. In the same period, the share of transport increased from 30.3 to 33.9%. The share of industry increased from 15% to 15.4%.

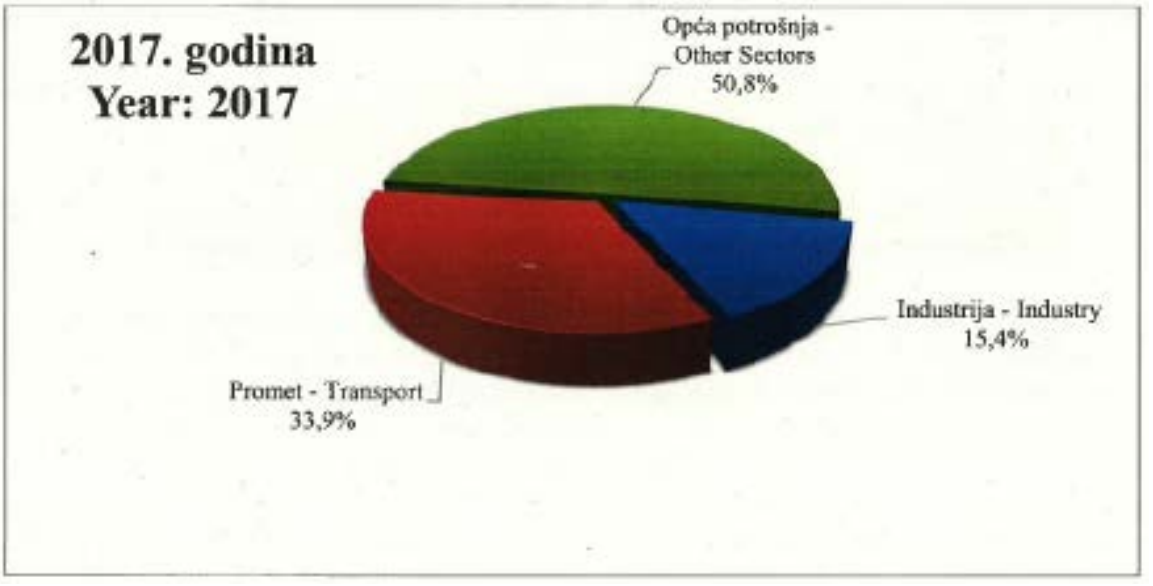


Figure 5. Shares per sector in total energy consumption

(Source: Energy in Croatia 2017)

INDUSTRY

Table 3 gives a breakdown of the consumption of all forms of energy in industry in the period 2012-2017. In 2017, energy consumption in industry increased by 10.4% compared with the previous year. This increase in consumption was the result of increased consumption of all forms of energy used. The maximum percentage increase was the 27.8% increase in the consumption of wood and biomass. Coal and coke consumption increased by 15.7%, natural gas consumption by 15% and steam and hot water consumption by 9.1%. Electricity consumption increased by 5.5% and liquid fuel consumption by 2.1%.

In the period 2012-2017, energy consumption in industry grew at an average annual rate of 1.4%. In this period, the trend was for growth in the consumption of most forms of energy with the exception of liquid fuels and natural gas, consumption of which declined at average annual rates of 5.6% and 0.7% respectively. The fastest growth was in the consumption of electricity and of coal and coke at average annual rates of 3.7% and 2.9% respectively. Consumption of steam and hot water and of fuel wood and other biomass increased at the same average annual rate of 1%.

Tablica 3. Neposredna potrošnja energije u industriji
Table 3. Final Energy Consumption in Industry by Fuel

	2012	*2013*	*2014*	*2015*	*2016*	*2017*		*2017/16*	*2012-17*
	PJ							*%*	
Ugljen i koks *Coal and coke*	7.63	8.74	8.54	8.05	7.61	8.81		15.7	2.9
Ogrjevno drvo 1 biomasa *Fuel Wood and biomass*	1.18	0.96	0.92	1.17	0.98	1.25		27.8	1.0
Tekuća goriva *Liquid Fuels*	2.76	2.51	2.40	2.19	2.02	2.06		2.1	-5.6
Plinovita goriva *Gaseous Fuels*	8.14	7.31	7.21	7.30	6.85	7.88		15.0	-0.7
Električna energija *Electricity*	10.65	11.05	11.59	12.09	12.08	12.74		5.5	3.7
Para i vrela voda *Steam and Hot Water*	11.20	10.34	9.98	9.62	10.77	11.74		9.1	1.0
UKUPNO ***TOTAL***	**41.56**	**40.91**	**40.63**	**40.42**	**40.30**	**44.48**		**10.4**	**1.4**

Source: Energy in Croatia 2017.

TRANSPORT

Table 4 shows the evolution of the breakdown of energy consumption in transport in the period 2012-2017. Energy consumption in transport increased by 8.1% in 2017 compared with 2016. The consumption of most energy products increased, with reductions only in the consumption of liquid biofuels (48%) and petrol (3.8%). The greatest percentage increase of 18.1% was in the consumption of jet fuel. Natural gas consumption increased by 15.6%, with diesel fuel consumption by 12.5%. The increase in consumption was smallest for electricity (6.9%).

In the period 2012-2017, energy consumption in transport increased at an average annual rate of 3.1%.

Tablica 2.13.1. Neposredna potrošnja energije u prometu
Table 2.13.1. Final Energy Consumption in Transport by Fuels

	2012	2013	2014	2015	2016	2017		2017/16	2012-17
	PJ							%	
Tekuća biogoriva *Liquid biofuels*	1.51	1.33	1.25	1.02	0.04	0.02		-48.0	-56.6
Ukapljeni plin *LPG*	2.57	2.64	2.83	3.14	3.32	3.32			5.2
Prirodni plin *Natural gas*	0.03	0.06	0.13	0.14	0.15	0.18		15.6	39.1
Motorni benzin *Petrol*	25.80	25.20	23.26	23.20	23.29	22.41		-3.8	-2.8
Mlazno gorivo *Jet fuel*	4.98	5.44	5.46	5.30	5.60	6.61		18.1	5.8
Dizelsko gorivo *Diesel oil*	48.00	49.74	50.59	54.52	57.22	64.35		12.5	6.0
Loživa ulja *Fuel oils*	0.08	0.08	0.02						
Električna energija *Electricity*	1.04	1.01	0.99	1.05	1.09	1.16		6.9	2.3
UKUPNO ***TOTAL***	**84.02**	**85.51**	**84.53**	**88.37**	**90.71**	**98.04**		**8.1**	**3.1**

Source: Energy in Croatia 2017.

Table 5 shows energy consumption in individual modes of transport in the period 2012-2017. In 2017, energy consumption increased in most transport modes, with a consumption reduction trend recorded only in rail transport. Energy consumption in rail transport decreased at an average rate of 4% per year. The average annual rate of increase in energy consumption in air transport was 5.9% and in road transport 3.1%. The trend of growth of energy consumption in maritime and river transport and in public urban transport was recorded with average annual rates of 4.6% and 1.6% respectively. Consumption grew the fastest in the Non specified category, at an annual growth rate of 15%.

Tablica 5. Potrošnja energije pojedinih vrsta prometa
Table 5. Final Energy Consumption by Means of Transport

	2012	2013	2014	2015	2016	2017		2017/16	2012-17
	PJ							%	
Željeznički promet *Rail Transport*	1.65	1.54	1.43	1.30	1.34	1.34		0.6	-4.0
Cestovni promet *Road Transport*	74.30	75.19	74.17	78.37	80.26	86.37		7.6	3.1
Zračni promet *Air Transport*	5.07	5.55	5.56	5.40	5.71	6.75		18.1	5.9
Pomorski i riječni promet *Sea and River Transport*	1.58	1.79	1.93	1.84	1.87	1.98		5.7	4.6
Javni gradski promet *Public City Transport*	1.349	1.36	1.35	1.35	1.406	1.464		4.1	1.6
Ostali promet *Non Specified*	0.07	0.09	0.09	0.11	0.12	0.14		12.5	15.0
UKUPNO PROMET ***TOTAL TRANSPORT***	**84.02**	**85.51**	**84.53**	**88.37**	**90.71**	**98.04**		**8.1**	**3.1**

Source: Energy in Croatia 2017.

GENERAL CONSUMPTION (HOUSEHOLDS, SERVICES, AGRICULTURE AND CONSTRUCTION)

The general consumption sector comprises the household, service, agriculture and construction sectors. Table 6 shows the breakdown of energy consumption in the general consumption sector in the period 2012-2017. In 2017, energy consumption in the general consumption sector increased by 0.5% compared with the preceding year. While the consumption of fuel wood and biomass, liquid fuels and heat fell, the consumption of other forms of energy increased. Consumption of natural gas increased by 3.1%, electricity by 4%, other renewables by 2.4% and coal by 25.2%. Consumption of fuel wood decreased by 3.1% and that of liquid fuels by 1.6%. Consumption of heat fell by 1.2%.

Tablica 6. Neposredna potrošnja energije u općoj potrošnji
Table 6. Final Energy Consumption in Other Sectors by Fuels

	2012	*2013*	*2014*	*2015*	*2016*	*2017*	*2017/16*	*2012-17*
	PJ						%	
Ugljen *Coal*	0.22	0.18	0.11	0.09	0.10	0.12	25.2	-10.5
Ogrjevno dno i biomasa *Fuel Wood and Biomass*	48.57	48.27	42.88	48.84	47.50	46.02	-3.1	-1.1
Tekuća goriva *Liquid Fuels*	23.36	21.66	19.80	20.82	20.51	20.19	-1.6	-2.9
Plinovita goriva *Gaseous Fuels*	27.73	26.87	24.45	26.52	28.06	28.92	3.1	0.8
Električna energija *Electricity*	43.50	42.11	40.76	42.01	41.87	43.55	4.0	0.02
Toplinska energija *Heat*	8.09	8.23	6.85	7.20	7.43	7.34	-1.2	-1.9
Obnovljivi izvori Renewables	0.59	0.63	0.71	0.81	0:86	0.88	2.4	8.3
UKUPNO ***TOTAL***	**152.07**	**147.95**	**135.56**	**146.29**	**146.33**	**147.02**	**0.5**	**-0.7**

Source: Energy in Croatia 2017.

The consumption of energy by individual general consumption sectors in the period 2012-2017 and in the period 1988-2017 is shown in Table 7 and Figure 6 respectively. Consumption in the general consumption sector increased by only 0.5% in 2017, with consumption falling in households, agriculture and construction but increasing by 4.9% in the service sector, Compared with the previous year, energy consumption in households fell by 0.7%, in agriculture by 1.3% and in construction by 1.2%.

Tablica 7. Potrošnja energije u podsektorima opće potrošnje
Table 7. Flnal Energy Consumption in Other Sectors by Subsectors

	2012	*2013*	*2014*	*2015*	*2016*	*2017*	*2017/16*	*2012-17*
	PJ						%	
Kućanstva *Households*	107.22	104.28	93.63	101.68	100.85	100.15	-0.7	-1.4
Uslužni sektor *Services*	30.45	29.60	28.06	30.80	31.65	33.22	4.9	1.8
Poljoprivreda *Agriculture*	9.61	9.47	9.70	9.64	9.78	9.65	-1.3	0.1

Građevinarstvo *Construction*	4.79	4.60	4.16	4.16	4.05	4.00	-1.2	-3.5
UKUPNO OPĆA POTROŠNJA	**152.07**	**147.95**	**135.56**	**146.29**	**146.33**	**147.02**	**0.5**	**-0.7**

Source: Energy in Croatia 2017.

IV. GROSS VALUE ADDED BY SECTOR

Table 8. Gross value added			
Gross value added - GVA	**2014**	**2015**	**2016**
Industry	HRK 40 771 056 000	HRK 42 466 303 000	HRK 44 520 125 000
Services*	HRK 205 370 168 000	HRK 208 792 778 000	HRK 215 614 834 000

Source: Croatian Bureau of Statistics, 2018 Statistical Yearbook.

*** GVA services = GVA total - (GVA1 + GVA2 + GVA3 + GVA4)**

GVA1 - Gross value added for *agriculture, forestry and fisheries*
GVA2 - Gross value added for *mining and quarrying*
GVA3 - Gross value added for *processing industry*
GVA4 - Gross value added for *construction*

Data on GVA in 2017 are not available in the 2018 Statistical Yearbook.

V. DISPOSABLE HOUSEHOLD INCOME

Table 9. Disposable household income		
	2010	**2017**
Disposable annual household income in the	HRK 86 975	HRK 92 334

Source: Croatian Bureau of Statistics, 2018 Statistical Yearbook.

Household disposable income for 2017 is given as an overall indicator of poverty and social exclusion.

According to the 2018 Statistical Yearbook, the average monthly net salary in 2017 was **HRK 5 985** and the average monthly gross salary in 2017 was **HRK 8 055**. Data for annual average household expenditure on consumption is not available in the 2018 Statistical Yearbook.

VI. GROSS DOMESTIC PRODUCT

Table 10. Gross Domestic Product - GDP	
	2017
Gross Domestic Product - GDP	HRK 365 643 million
	EUR 11 880 per capita

Source: Croatian Bureau of Statistics, 2018 Statistical Yearbook.

VII. ELECTRICITY GENERATION IN THERMAL POWER PLANTS

Table Electricity generation in thermal power plants				
GWh		2016	2017	2016/17 %
Proizvodnja	Production			
- termoelektrane	*- thermal power plants*	2893.5	1395.9	-51.8

Source: Energy in Croatia 2017.

VIII. GENERATION OF ELECTRICITY IN COMBINED HEAT AND POWER PLANTS (CHP), INCLUDING INDUSTRIAL WASTE HEAT FACILITIES

Table 12. Generation of electricity in combined heat and power plants (CHP), including industrial waste heat facilities				
GWh		2016	2017	2016/17 %
Proizvodnja	Production			
- javne toplane	*- public cogeneration plants*	1 457.2	3 383.0	132.2
- industrijske toplane	*- industrial cogeneration plants*	330.6	414.2	25.3
Ukupno	*Total*	1 787.80	3 797.2	

Source: Energy in Croatia 2017.

IX. HEAT GENERATION FROM THERMAL POWER PLANTS

Thermal power plants in Croatia do not produce heat alone; they produce heat alongside electricity in a co-generation process. The figures for heat energy obtained from these processes are shown in Section X - Generation of heat from combined heat and power plants, including industrial waste heat.

The production of heat in thermal power plants under this heading is therefore equal to zero.

X. GENERATION OF HEAT IN COMBINED HEAT AND POWER PLANTS, INCLUDING INDUSTRIAL WASTE HEAT FACILITIES.

Table 13. Generation of heat in combined heat and power plants, including industrial waste heat facilities				
PJ		2016	2017	2016/17, %
Javne toplane	-public cogeneration plants	9 095	10 658	17.2

Source: Energy in Croatia 2017.

XI. FUEL INPUT FOR THERMAL POWER PLANTS

Table 14 shows the fuel input in all energy transformations, broken down by energy source.

Table 14. Fuel input for thermal power plants				
		Ugljen 1000 ten	Derivati nafte 1000 ten	Plinovita goriva 1000 ten
		Coal 1000 toe	Petroleum Products 1000 toe	Gas 1000 toe
Javne elektrane	Public Electricity Plants	-312.7	-1.2	-4.4

Javne toplane	Public CHP Plants	-	-32.7	-615.0

Source: Energy in Croatia 2017.

XII. PASSENGER-KILOMETRES (PKM)

The transport sector is currently one of the largest energy consumers in Croatia; moreover, the consumption figures are set to grow faster than in the other sectors. Energy consumption in transport increased by 8.1% in 2017 compared to 2016, indicating great potential for energy efficiency measures to be implemented.

The potential for increasing efficiency lies mostly in optimising the mix of forms of transport, maximising the exploitation of capacities (increasing the load factor) and deploying more efficient motorbikes and vehicles and appropriate driving regimes.

Table 15. Passenger-							
		2012	**2013**	**2014**	**2015**	**2016**	**2017**
Motor cars - petrol	[10^ pkm]	14.669	14.347	13.322	13.616	13.798	13.465
Motor cars - diesel	[10^ pkm]	17.873	18.474	18.7!	21.087	22.235	25.068
Motor cars - electric	[10^ pkm]	0.002	0.003	0.004	0.012	0.015	0.013
Motor cars - CNG	[10^ pkm]	0.003	0.002	0.003	0.002	0.002	0.003
Motor cars - LPG	[10^ pkm]	1.596	1.647	1.73	1.968	2.076	2.092
Aircraft	[10^ pkm]	0.158	0.15	0.154	0.153	0.164	0.172
Motorcycles	[10^ pkm]	0.234	0.232	0.22	0.227	0.22	0.224
Buses (diesel)	[10^ pkm]	6.389	6.899	6.607	8.002	8.218	8.431
Buses - CNG	[10^ pkm]	0.032	0.068	0.122	0.128	0.145	0.169
Trains	[10^ pkm]	1.104	0.858	0.927	0.951	0.836	0.745
Trams - electric	[10^ pkm]	1.128	1.094	1.06	1.227	1.271	1.233
Total		**43.187**	**43.775**	**42.858**	**47.373**	**48.981**	**51.613**

Source: Hrvoje Požar Energy Institute

The official statistics (courtesy of the Croatian Bureau of Statistics) comprise only public transport figures; passenger cars, which have by far the largest share, are not included. These figures were obtained by the Hrvoje Požar Energy Institute through modelling based on past results. The table above shows total pkm results for the period 2012-2017; the figures are based on modelling and give a realistic picture of the relationship between different modes of transport.

As expected, passenger car transport accounts for the largest share in the passenger kilometre structure (estimate based on the number of registered cars, average annual distance travelled and average car occupancy).

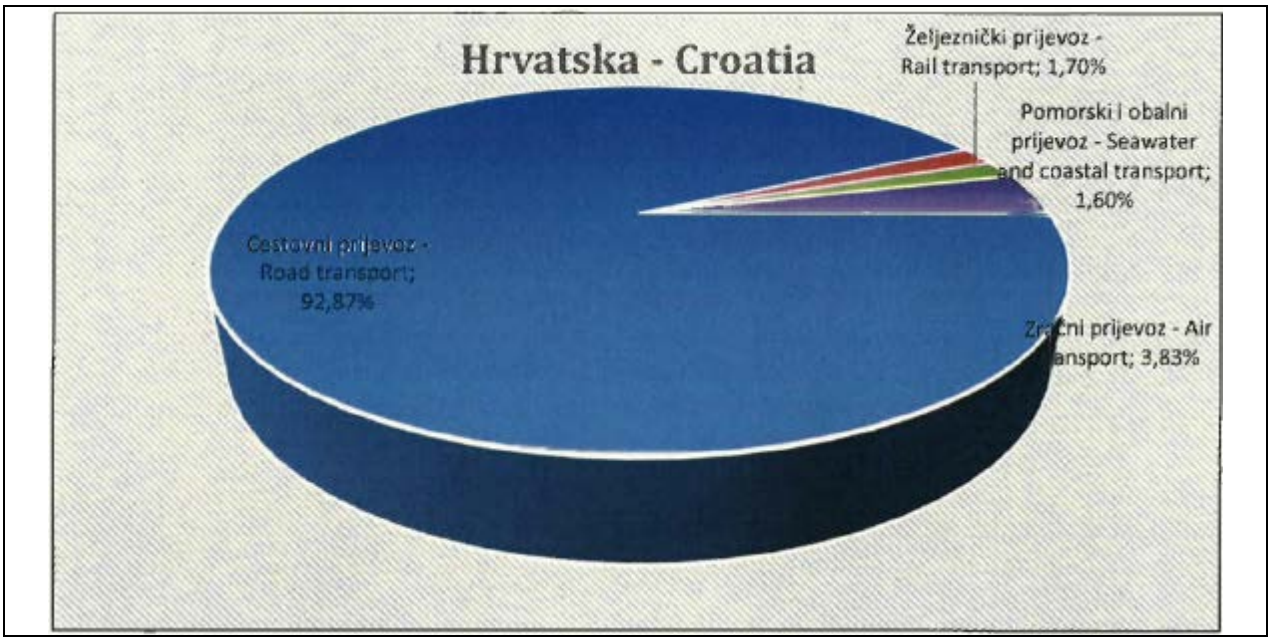


Figure 7. Passenger kilometre structure in passenger transport in Croatia in 2017

(Source: Energy in Croatia 2017)

Between 1995 and 2008, the number of passenger cars in Croatia grew steadily, at an average annual rate of 4.9%. The number of passenger cars registered increased from 817 229 in 1995 to 1 537 981 by the end of 2008. In 2009 the number of registered passenger cars declined for the first time since 1995. The downward trend continued in 2010, when the number of registered cars totalled 1 517 079 (meaning that, with around 343 cars per 1 000 inhabitants, one in three people in Croatia owned a car). In 2017, there was a total of 1 605 013 registered cars in Croatia (approximately 389 cars per 1 000 inhabitants).

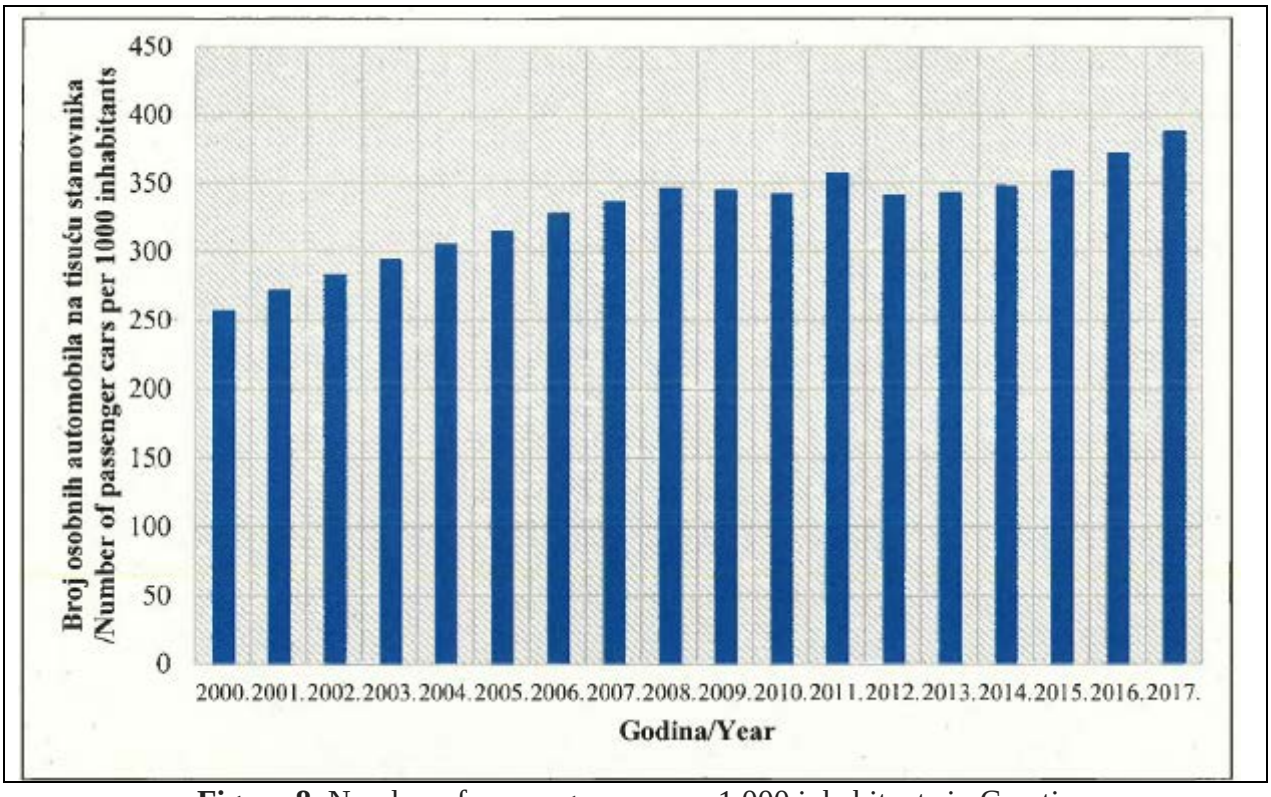
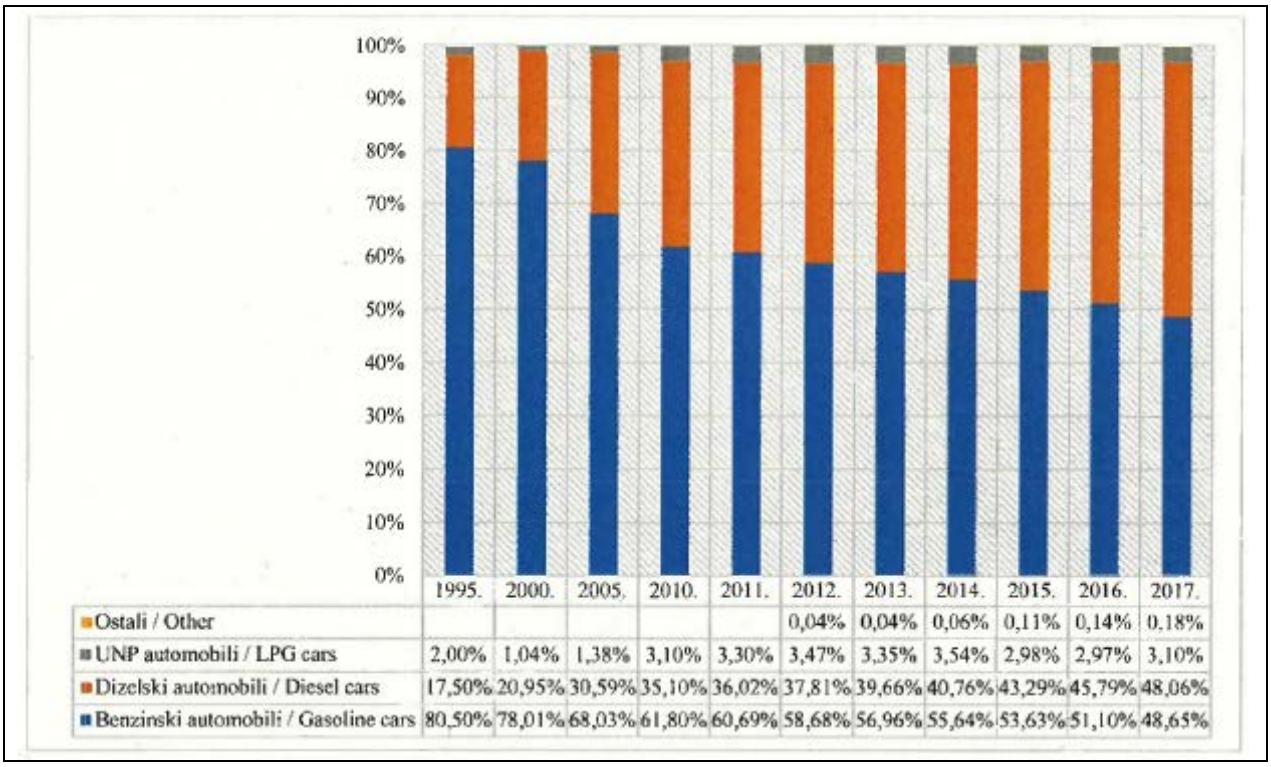


Figure 8. Number of passenger cars per 1 000 inhabitants in Croatia

(Source: Energy in Croatia 2017)

In the period under consideration (1995-2017), the Republic of Croatia saw a significant increase in the share of diesel cars in the total number of passenger cars, with an indication of the trend being maintained in the future (in total, the number of diesel cars increased by more than 400%). In the breakdown of the total number of passenger cars, the share of petrol cars dropped from 80.5% in 1995 to 48.7% in 2017 while, in the same period, the share of diesel cars grew from 17.5% to 48.1%. The share of liquefied petroleum gas (LPG) cars increased from 2.0% in 1995 to 3.1% in 2017.



	1995.	2000.	2005.	2010.	2011.	2012.	2013.	2014.	2015.	2016.	2017.
Ostali / Other						0,04%	0,04%	0,06%	0,11%	0,14%	0,18%
UNP automobili / LPG cars	2,00%	1,04%	1,38%	3,10%	3,30%	3,47%	3,35%	3,54%	2,98%	2,97%	3,10%
Dizelski automobili / Diesel cars	17,50%	20,95%	30,59%	35,10%	36,02%	37,81%	39,66%	40,76%	43,29%	45,79%	48,06%
Benzinski automobili / Gasoline cars	80,50%	78,01%	68,03%	61,80%	60,69%	58,68%	56,96%	55,64%	53,63%	51,10%	48,65%

Figure 9. Structure of passenger cars by fuel type (1995-2017).

(Source: Energy in Croatia 2017)

The figures reflect an obvious shift in consumer habits in terms of their demand for bigger, more powerful cars; at the same time, relatively good conditions are in place for buying smaller, more energy-efficient diesel cars. This positive structural shift was based solely on market principles, i.e. the affordability of diesel fuel during the reference period, without any specific incentives being applied.

XIII. TONNE-KILOMETRES (TKM)

The key indicator of energy efficiency in the transport sector is the breakdown of the various modes of transport, whereby, for example, a larger share of rail transport is an indicator of a higher degree of energy efficiency in freight transport.

The tonne-kilometre breakdown (Figure 10) shows that in Croatia freight is transported primarily by road.

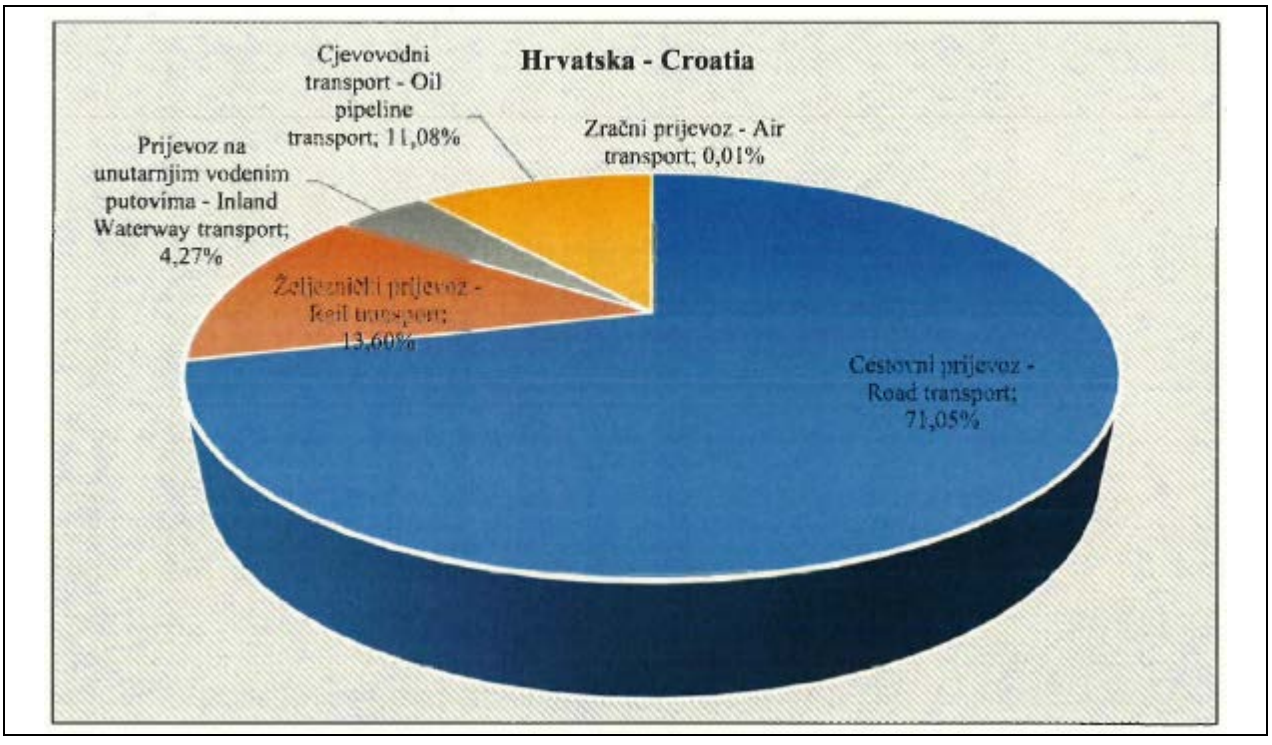


Figure 10. Tonne-kilometre breakdown in freight transport in the Republic of Croatia in 2017

(Source: Energy in Croatia 2017)

Note that the breakdown does not include maritime and coastal transport, which distort the picture somewhat due to the fact that the large distances covered in international shipping result in a large share of tkm in the EU.

Table 16 shows the breakdown of tonne-kilometres.

Table 16. Tonne-kilometres		
Tonne kilometres (tkm)	**2016**	**2017**
Road transport	11 337 000 000 km	11 833 000 000 km
Rail transport	2 160 000 000 km	2 595 000 000 km
Pipeline transport	1 921 000 000 km	2,111 000 000 km
Air transport	2 000 000 km	2 000 000 km
Inland waterway transport	836 000 000 km	813 000 000 km
TOTAL	**16 256 000 000 km**	**17 354 000 000 km**

Source: Croatian Bureau of Statistics, 2018 Statistical Yearbook.

XIV. COMBINED TRANSPORT KILOMETRES - WHERE DATA IN SECTIONS XII AND XIII ARE NOT AVAILABLE

The two preceding sections provide data for passenger-kilometres and tonne-kilometres separately.

XV. POPULATION

Size: 4 284 889 (Source: Croatian Bureau of Statistics, 2018 Statistical Yearbook; the most recent population census was in 2011)

Number of households: 1 519 038 (average number of household members: 2.80)

(Source: Croatian Bureau of Statistics, 2018 Statistical Yearbook

Population density per km^2: 75.7 Capital city: Zagreb (790 017 inhabitants)

Language: Croatian

Script: Latin alphabet

Currency: Kuna (HRK)

B. Updates on major legislative and non-legislative measures implemented in the preceding year which contribute towards the overall national energy efficiency targets for 2020.

MAJOR LEGISLATIVE AND NON-LEGISLATIVE MEASURES IN 2018.

Act amending the Energy Efficiency Act, published on 21 December 2018 in NN No 116/2018. This Act ensures the implementation of Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU ('Regulation (EU) 2017/1369').

C. The total building floor area of the buildings with a total useful floor area over 500 m^2 and as of 9 July 2015 over 250 m^2 owned and occupied by the Member States' central government that, on 1 January of the year in which the report is due, did not meet the energy performance requirements referred to in Article 5(1).

Does not apply to Croatia, which has opted for an alternative approach to calculating energy savings in eligible buildings owned and occupied by central government.

D. Total floor area of heated and/or cooled buildings owned and occupied by the Member State's central government, renovated in the preceding year as provided for in Article 5(1) or the amount of energy savings in eligible buildings owned and occupied by central government in accordance with Article 5(6).

Directive 2012/27/EU requires Member States to achieve energy savings in public buildings owned or occupied by the central authorities by renovating at least 3% per year of the floor area in those buildings so as to at least equal the investment in the renovation of public and private residential and non-residential buildings, which must take into account an overview of the national building stock, cost-effective approaches to renovation relevant to the building type and climatic zone, policies and measures to encourage in-depth reconstruction, including the refurbishment of buildings, an overview of future market trends to guide investment decisions of individuals, the construction industry and financial institutions, and an estimate of expected energy savings and wider benefits.

Croatia has opted for the alternative approach and has set an energy savings target, expressed in petajoules (PJ). The Energy Management Information System (EMIS) was used to calculate the energy savings target. The EMIS contains information on the real consumption of energy and

water in public sector buildings. Data for more than 14 000 buildings have been entered in the EMIS database.

Croatia's target for energy savings equivalent to the energy renovation of 3% of State building stock per year was calculated as 0.00489 PJ per year.

The target achieved for 2018 is 0.030847 PJ, which exceeds the planned annual target of 0.00489 PJ.

Table 183% rate of renovation of central government buildings		
	Planned target	**Savings achieved**
3% rate of renovation of central	**0.00489 PJ**	**0.030847 PJ**

Source: National energy efficiency coordination body.

E. Energy savings achieved through the national energy efficiency obligation schemes referred to in Article 7(1) or the alternative measures adopted in application of Article 7(9).

Table 19. Savings achieved in 2018

Title of measure	**Savings [kWh]**	**Savings [PJ]**	**Savings [tCO_2]**	**Total investment amount [HRK]**	**Total funds disbursed by the Fund [HRK]**
RESIDENTIAL BUILDINGS					
Energy renovation of family homes					
Energy renovation of multi-residential buildings	474 149.23	0.00171	95.78	3 735 528.50	1 461 987.75
Combatting energy poverty					
PUBLIC SECTOR BUILDINGS					
Energy renovation of public buildings	28 088 276.91	0.10112	7 446.04	278 049 396.09	108 717 530.79
Systematic energy management in the public sector					
COMMERCIAL NON-RESIDENTIAL BUILDINGS					
Energy renovation for commercial non-residential buildings	200 103.27	0.00072	63.16	1 146 195.02	462 405.20
PUBLIC LIGHTING					
Energy efficiency in public lighting systems					
INDUSTRY					
Energy efficiency in manufacturing industries					
TRANSPORT					
Energy-efficient vehicles	1 009 385.52	0.00360	237.81	21 458 628.25	7 139 356.41
Eco-driving training					
Introduction of CO_2 emission-based taxation of motor cars					
Urban bicycle system					
TOTAL	**29 771 914.92**	**0.10715**	**7 842.79**	**304 389 747.86**	**117 781 280.15**

Source: System for monitoring, measuring and verifying energy savings.

Table 19 shows alternative policy measures achieved through public calls for tender under the Environmental Protection and Energy Efficiency Fund. Data on all measures carried out are available in the System for monitoring, measuring and verifying energy savings, which calculates energy savings using a bottom-up methodology.